

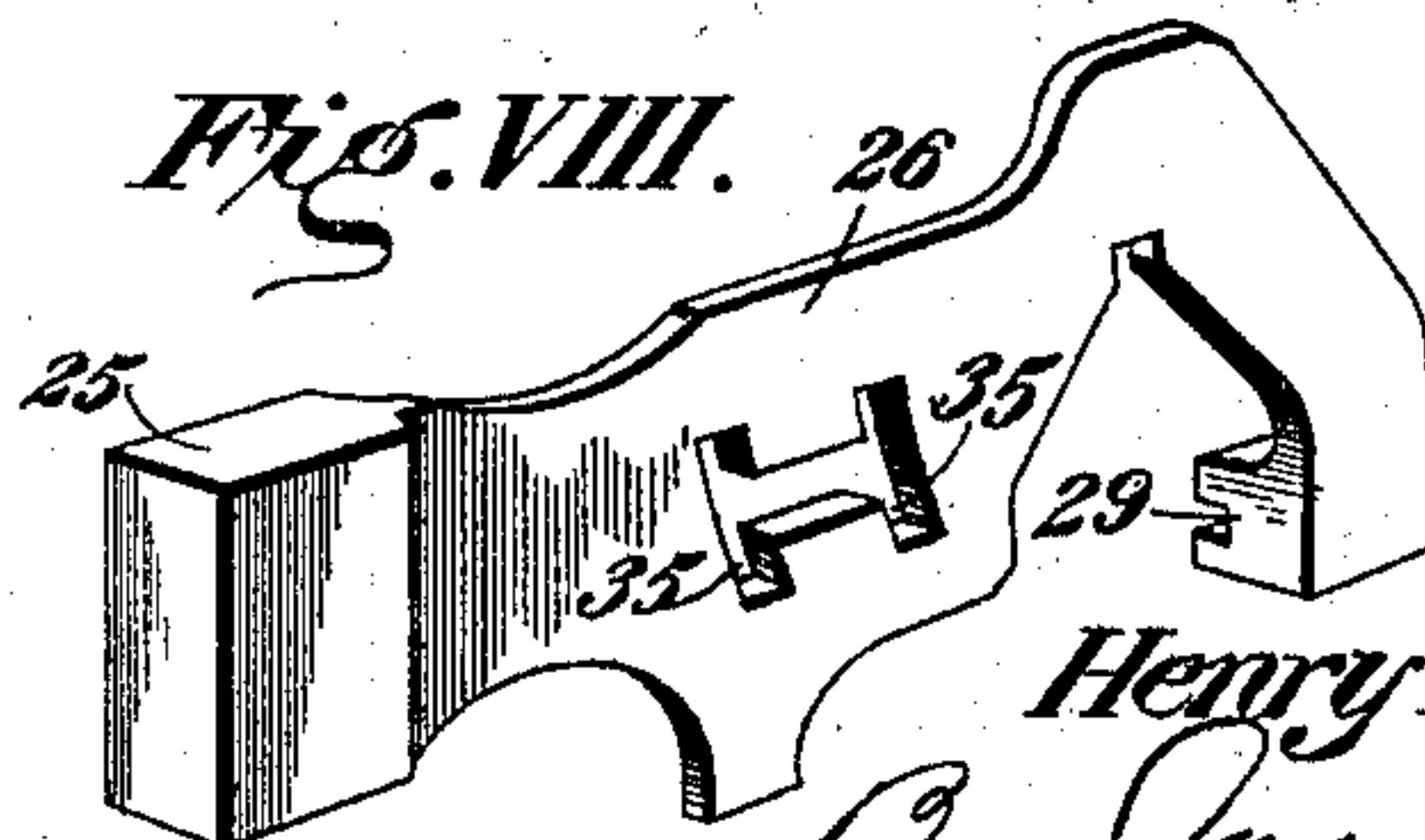
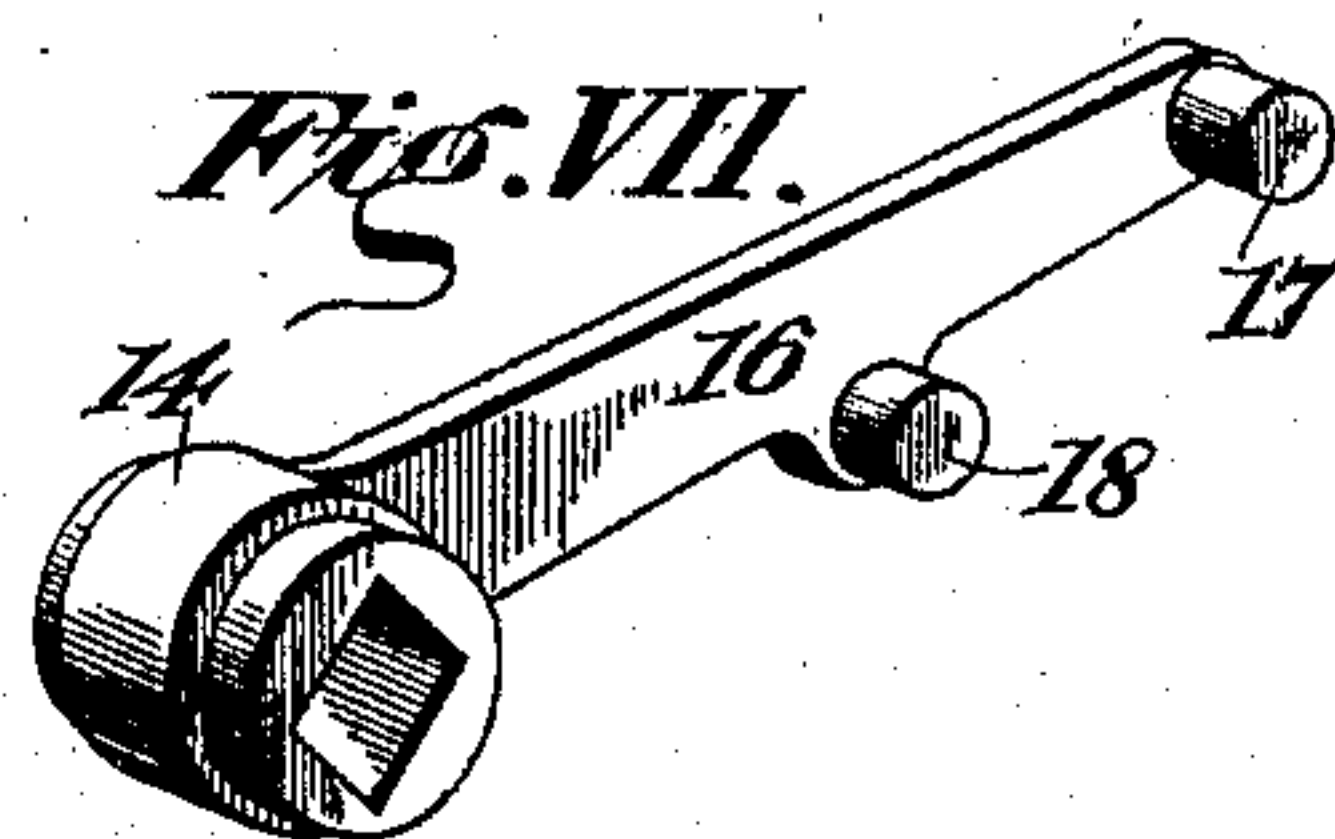
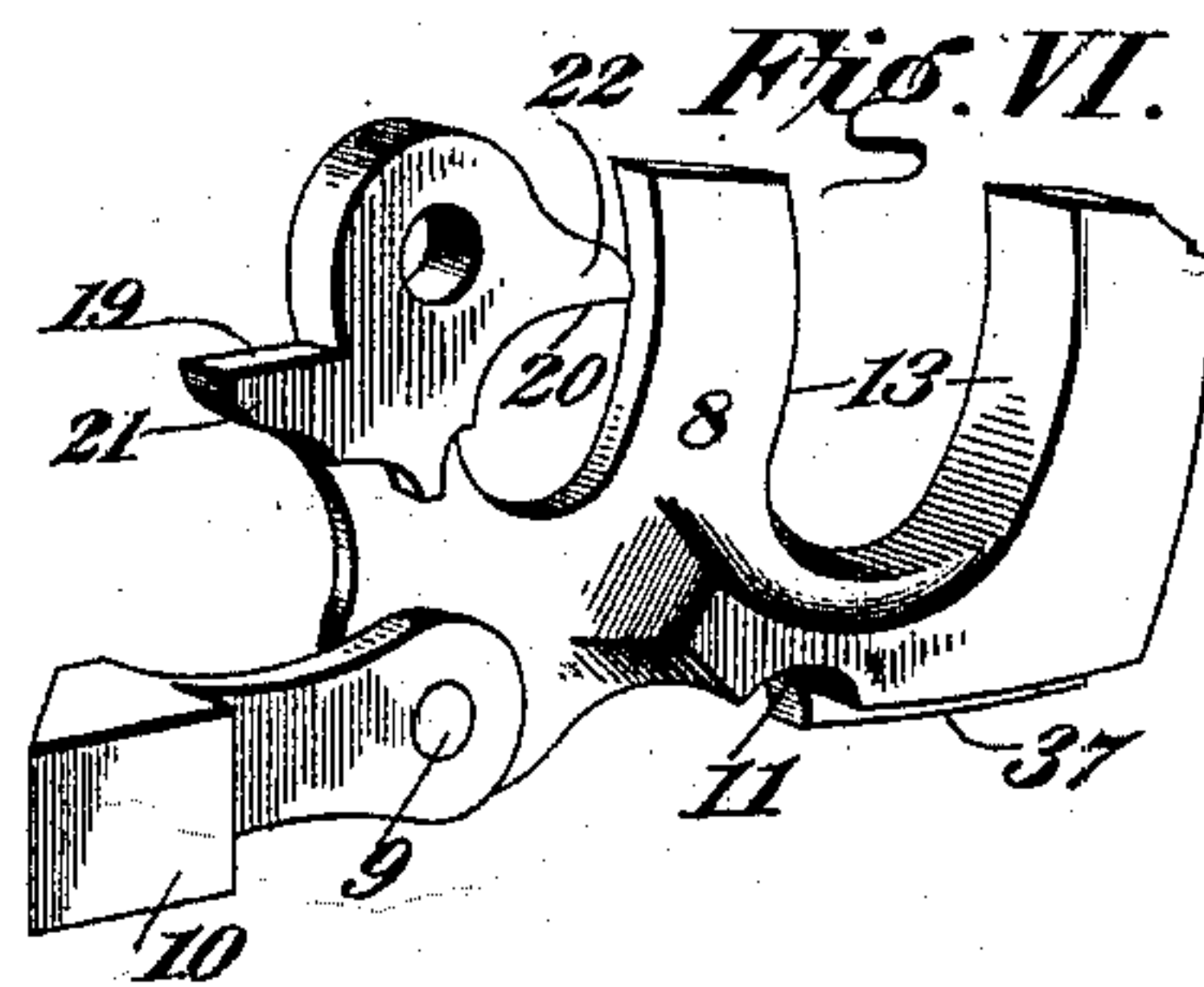
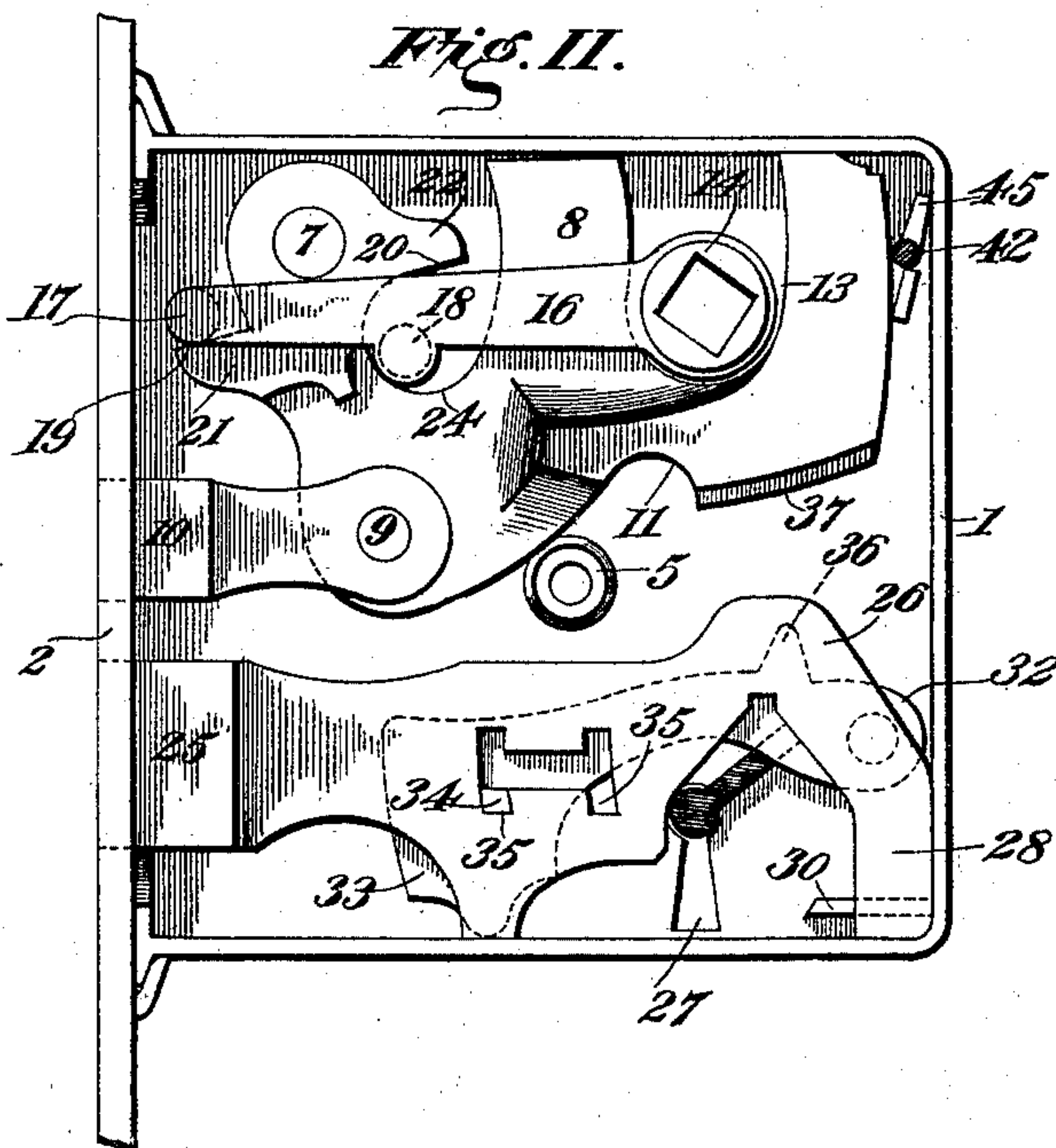
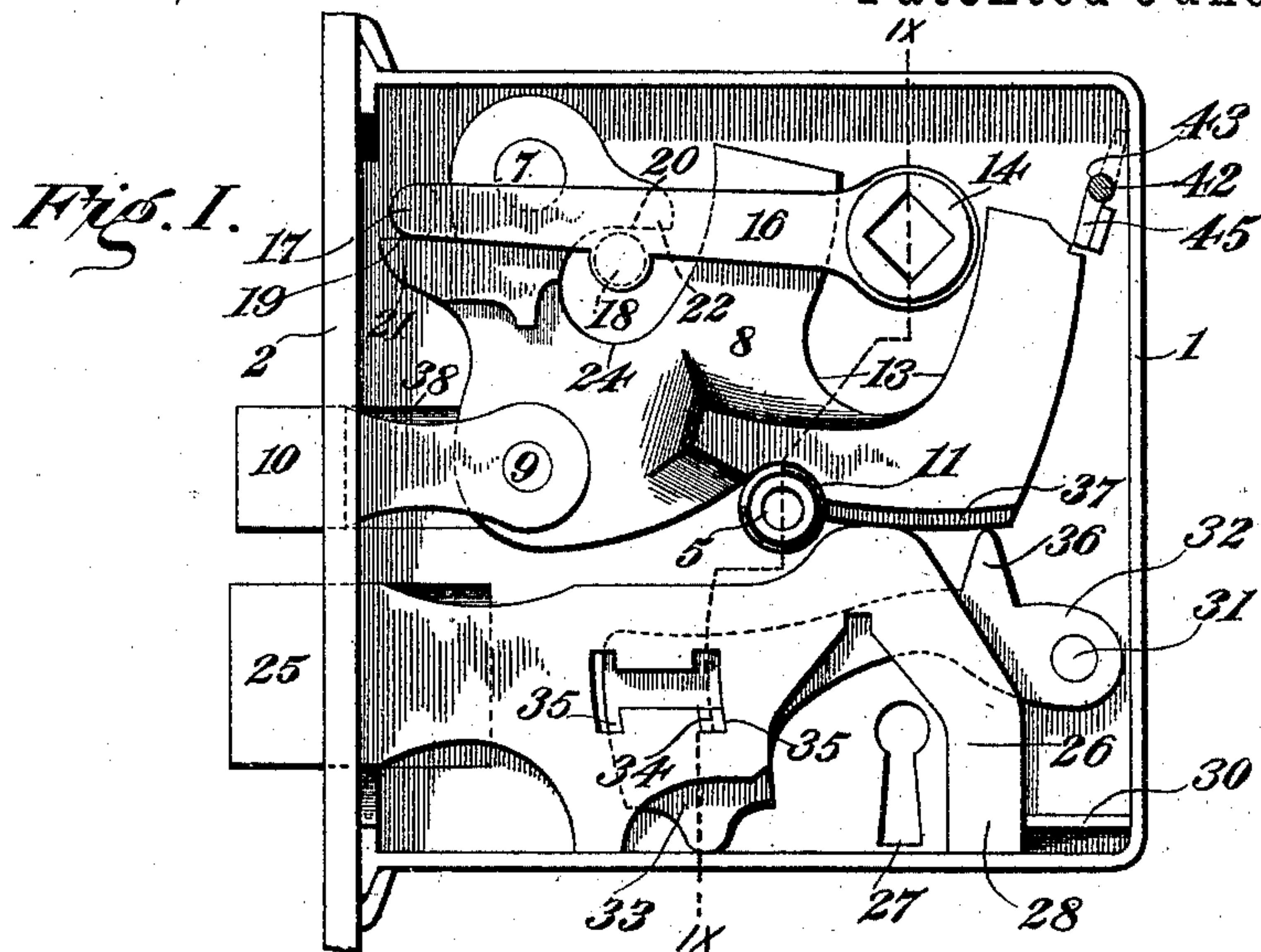
(No Model.)

2 Sheets—Sheet 1.

H. B. RICHARDSON.
LOCK.

No. 605,342.

Patented June 7, 1898.



Witnesses

McFouler
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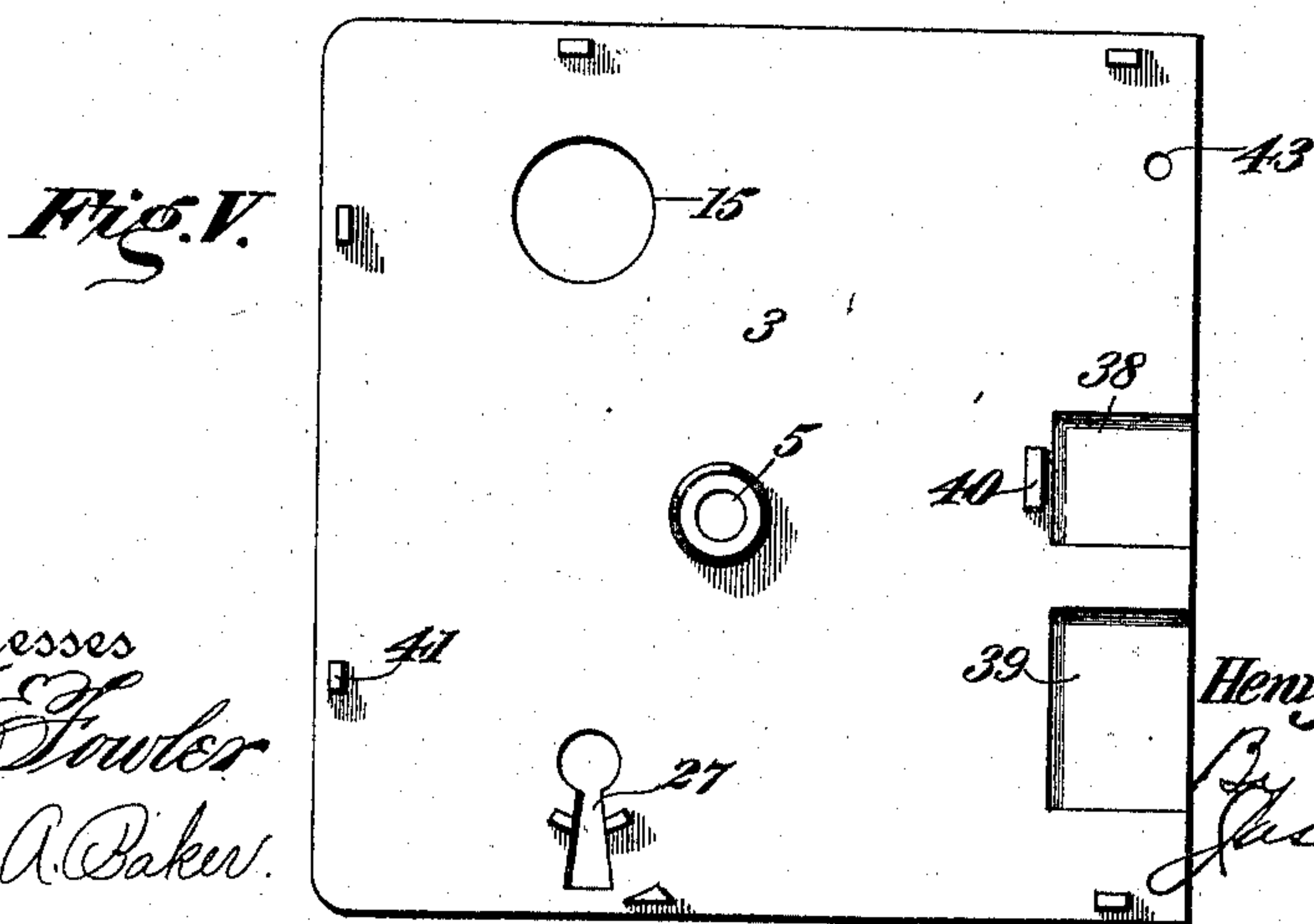
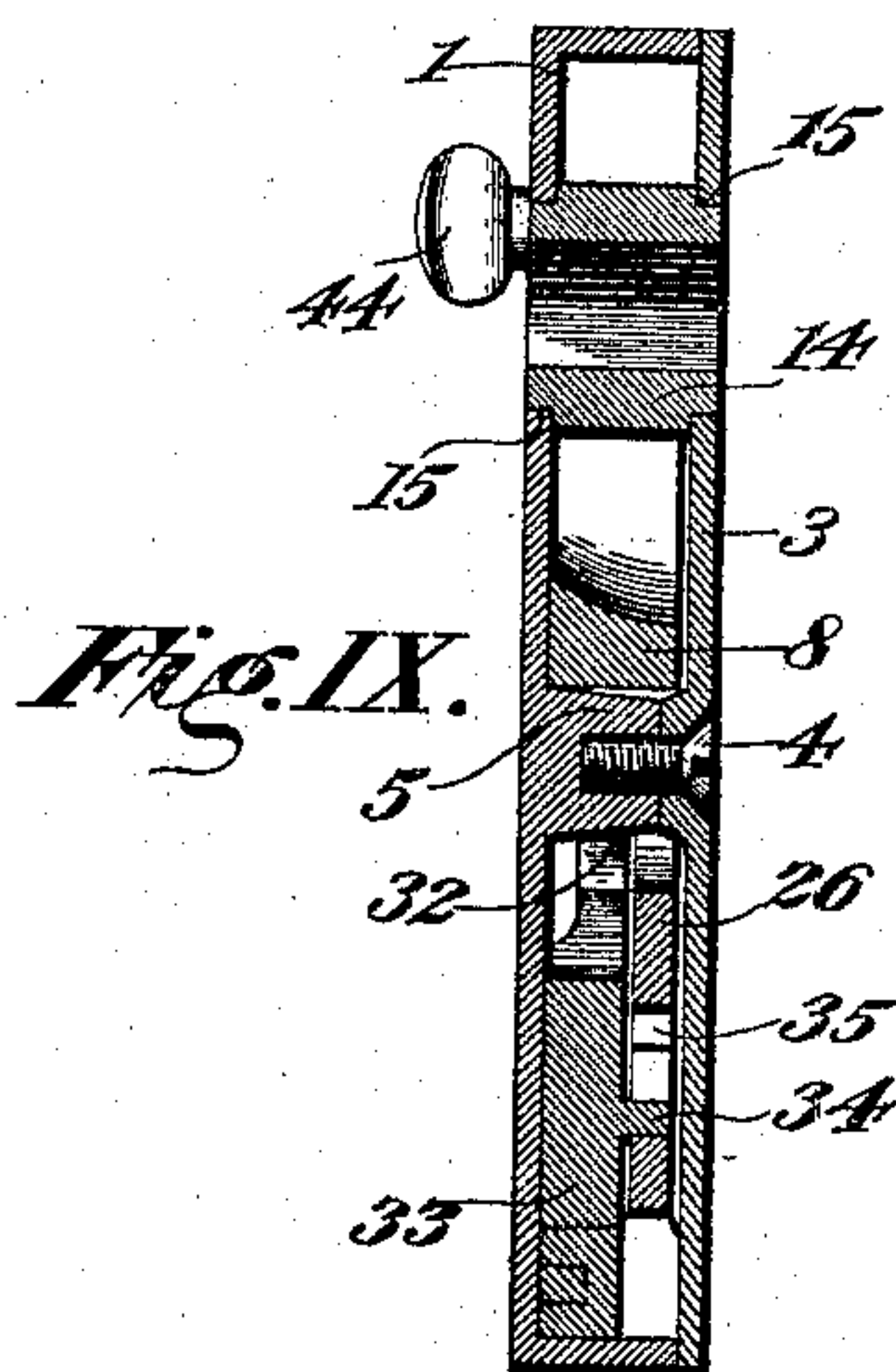
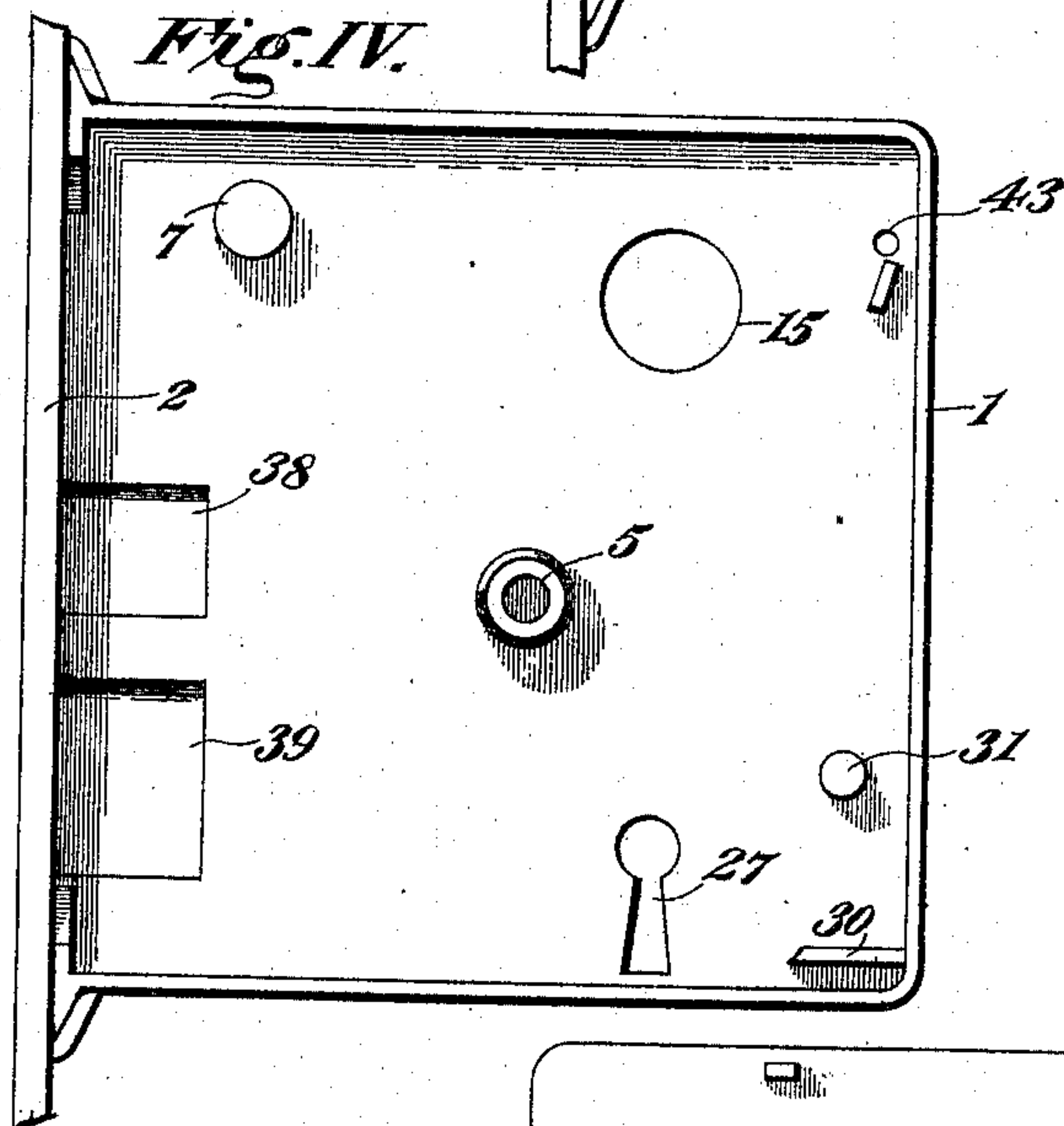
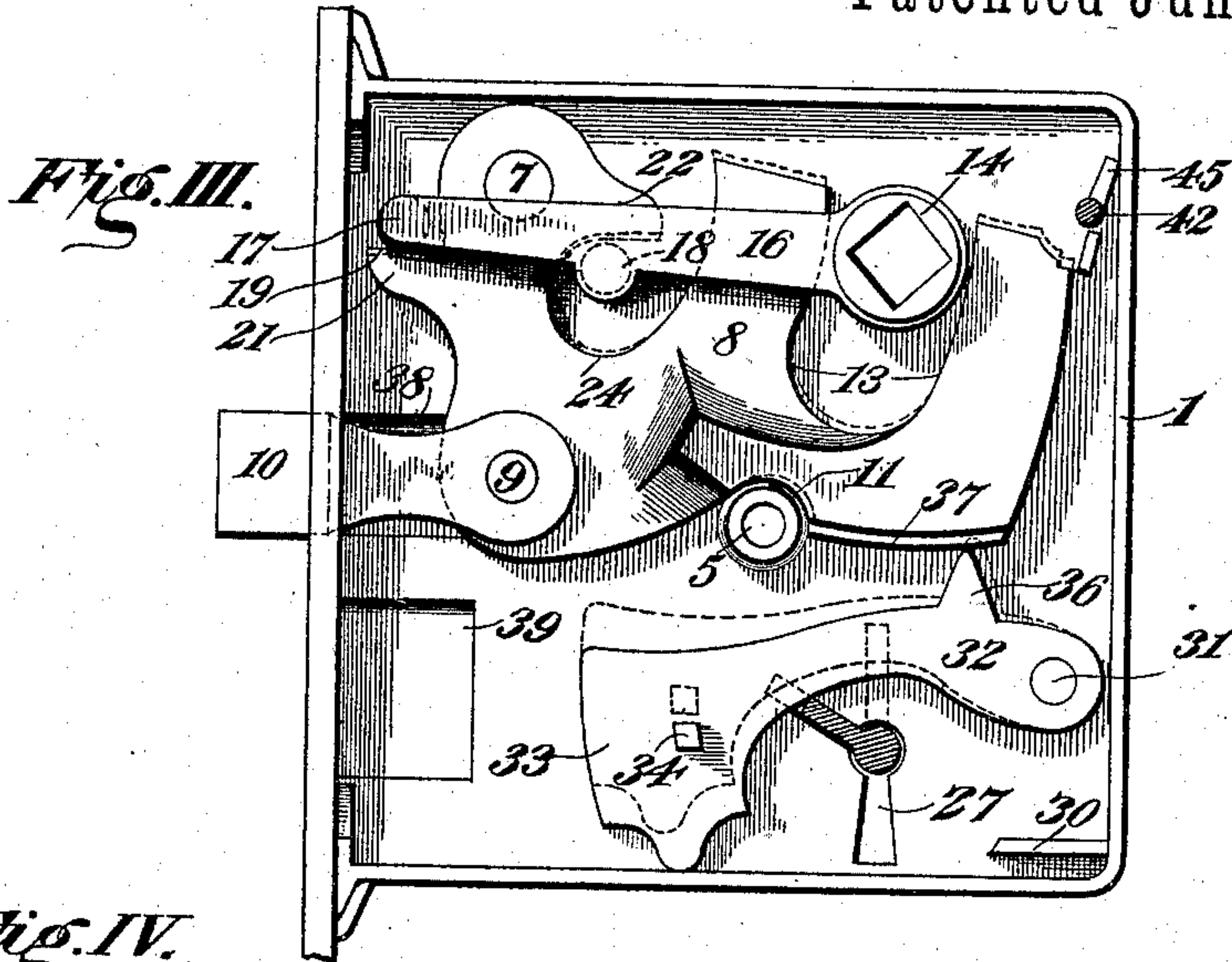
(No Model.)

H. B. RICHARDSON.
LOCK.

2 Sheets—Sheet 2.

No. 605,342.

Patented June 7, 1898.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY B. RICHARDSON, OF KEYTESVILLE, MISSOURI.

LOCK.

SPECIFICATION forming part of Letters Patent No. 605,342, dated June 7, 1898.

Application filed March 8, 1897. Serial No. 626,478. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. RICHARDSON, of Keytesville, in the county of Chariton, State of Missouri, have invented certain new and useful Improvements in Locks, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of the invention is to produce a springless lock provided with a latch-bolt and lock-bolt and mechanism for controlling the movements of said bolts, comprising a number of elements so constructed and arranged that the entire assemblage of parts within the lock-casing are interdependent and positively coöperative at all times and in such actual positive contact as will prevent independent movement of any part or element which would serve to create a rattle or vibration of any part or parts without the employment of springs, which are ordinarily employed to prevent lost motion and without which the accomplishment of the above-stated object has heretofore been impossible. To the accomplishment of this and other objects the invention consists in mounting within a suitable casing a latch-bolt-actuating counterweight pivoted at its upper forward corner adjacent to the upper front edge of the casing, and to which is pivoted at a point comparatively near the pivotal point of the counterweight a latch-bolt. The counterweight is extended rearwardly adjacent to the rear end of the casing, and its rear end at the farthest possible point from the fulcrum is in positive actual engagement with a lug or projection located adjacent to the pivot of a forwardly-extending tumbler, which latter operates to dog the lock-bolt and is incapable of any movement whatever independent of the latch-bolt-actuating counterweight.

The invention consists, further, in the provision of a knob-spindle located unobstructively in the path of the counterweight and provided with mechanism which coöperates with mechanism carried by the counterweight to actuate the latch-bolt, and, further, in the provision of a detent so located that when in the locking position it will firmly wedge the rear end or tailpiece of the counterweight in position to firmly retain the tumbler between the counterweight and the bottom wall of the casing. Every element within the casing

when the lock is in this position is absolutely interlocking and immovable.

In the accompanying drawings, Figure I is a side elevation of my preferred form of lock with the side plate removed, the parts being shown in the locked position. Fig. II is a similar view showing both bolts retracted or in the unlocked position. Fig. III is a view similar to Fig. I, with the lock-bolt removed, showing in full lines the position of the parts illustrated in Fig. I, and in dotted lines the tumbler lifted by the key-wing. Fig. IV is a view of the inside of the case with the locking mechanism removed. Fig. V is an inside view of the side plate of the lock detached. Fig. VI is a perspective view of the latch-bolt and latch-bolt counterweight detached, the parts being shown in the relative positions which they occupy in Fig. I. Fig. VII is an inside perspective view of the latch-bolt-actuating lever detached. Fig. VIII is a similar view of the lock-bolt detached. Fig. IX is a section on the line IX IX of Fig. I.

Referring to the figures on the drawings, 1 indicates a lock-case of any suitable shape secured, as usual, to a face-plate 2. The case is provided with the usual removable side plate 3, adapted to be secured in place, as by means of a screw 4, that enters an internally-screw-threaded aperture in the end of a post 5, projecting from the interior of the case 1.

Within the case I provide a cylindrical stud 7, which may be cast integral with the case and which, as illustrated, is located adjacent to the upper corner of the case near the face-plate. From the stud 7 is suspended the latch-bolt counterweight 8, that is provided with a stud 9, to which is movably and detachably secured the latch-bolt 10. The latch-bolt counterweight is in general contour of the shape of a trapezium, at the two corners of which, respectively, are located the studs 7 and 9. The shape of contour adopted for the latch-bolt counterweight is designed to secure to it sufficient weight, as well as sufficient swing upon the stud 7, to enable it, through the movement of its stud 9, to properly project and retract the latch-bolt, it being limited in its retractive movement to engagement with the side wall of the case—as shown in Fig. II, for instance—and in its projective movement by impingement against the post

5. A recess 11 is provided in its lower wall for the reception of the post. Toward its free end the counterweight is preferably provided with a preferably upwardly-opening recess 13, which may be slightly curved and concentric with the stud 7. The recess 13 is designed to accommodate with a minimum diminution of weight a spindle-hub 14, of ordinary construction, that is movably secured in the usual manner in bearing-apertures 15 in the side plates of the case. It is provided upon one side with an arm 16, that carries upon one side a pair of bearing-pins 17 and 18, the one being preferably in line with the longitudinal axis of the arm and the other to one side thereof. The bearing-pins 17 and 18 respectively bear alternately against oppositely-disposed bearing-faces 19 and 20 of oppositely-extending projections 21 and 22 upon the counterweight 8. A recess 24 is preferably provided in the counterweight to define the projection 22 in it and to permit free movement of the bearing-pin 18 against the bearing-face 20. The arm 16 extends above the stud 7 between the counterweight 8 and the side plate 3 of the case and at the same time operates the counterweight and holds it in place upon its stud.

Through the employment of the mechanism above described the counterweight may be swung upon its pivot 7, so as to retract the latch-bolt by rotatory movement in either direction imparted to the spindle-hub 14 in the usual manner.

By the use of a separate latch-bolt and latch-bolt-actuating member the latch-bolt may be faced in either direction to accommodate it to any door without respect to the direction in which it swings.

25 indicates a lock-bolt provided with a suitable tailpiece 26, within which the key-wing sweeps when inserted through the key-hole 27. The tailpiece terminates in a limiting guide-lug 28, which, fitting within the corner of the case, as shown in Fig. II, limits the rearward movement of the bolt and which is provided on its inner side with a groove 29, that receives a rib 30, projecting inwardly from the side wall of the case. Engagement of the rib with the walls of the groove serves to accurately guide the movements of the bolt under the impulse of its key.

31 indicates a pivot-pin projecting from the side wall of the case, upon which is mounted the tumbler 32. As illustrated, the pivot-pin 31 is located near the end of the case farther from the face-plate; but it may be otherwise disposed, its object being to bring the movable tumbler within operative relations with the key-wing. The tumbler is preferably provided at its free end with a ponderable head 33, which carries a dog 34, that is adapted to engage with suitable gatings 35 in the lock-bolt.

It is obvious that the relative locations of the dog and gatings may be varied, it being

sufficient that the tumbler be adapted to limit the movement of the bolt and that suitable mechanism be employed to impose a predetermined movement to the tumbler in order to cause it to release the bolt.

I prefer the dog upon the tumbler and the gatings in the lock-bolt, because they are adapted to perform both offices of detaining or dogging a bolt and fixing the degree of movement of the tumbler necessary to release the bolt.

As above stated, the free end of the tumbler is provided with a ponderable head. The head is designed to operate by gravity to compel the dog 34 upon the tumbler to enter the gatings provided in the bolt.

Within the limits of size imposed in ordinary locks it may be found impracticable in locks of certain sizes to make the tumbler sufficiently heavy to perform its office with accuracy and certainty. I therefore provide means for operatively connecting the tumbler with the latch-bolt counterweight and without impairing the mutual independence of the latch-bolt and lock-bolt. The means employed for accomplishing this object as illustrated in the drawings consists of a lug 36 upon the upper side of the tumbler that engages with the lower edge 37 of the counterweight. The parts referred to are so proportioned that when the counterweight is in its normal position, as shown in Fig. I, the lug 36 and the face 37 are in contact, the tumbler therein being at rest and at the limit of its downward movement. If now the key is inserted for the purpose of retracting the lock-bolt, its wing is turned against the tumbler, which raises the free end of the tumbler and through engagement of the lug 36 with the face 37 slightly raises the counterweight 8. The counterweight continues to press against the tumbler, urging it in the downward direction, until by the continued movement of the key the lock-bolt is retracted and the key-wing sweeps beyond engagement with the tumbler. Thereupon the tumbler, yielding to the impulse of its own weight, combined with that of the counterweight, descends to its limit of downward movement, the dog at the same time entering a gating 35 and securing the lock-bolt.

The employment of the lug 36, in constant contact with the counterweight 8, insures operative connection between the counterweight and the tumbler 32 without the excessive frictional resistance to movement of the tumbler which would be occasioned by a more extensive contact between those parts.

Heretofore where lock-bolt tumblers have been arranged in operative relation with a latch-bolt counterweight stop mechanism has been provided for limiting the movement of the counterweight in the direction of the tumbler, so that the counterweight is located at a point where it will be in contact with the upwardly-moving tumbler only at the upper

limit of the tumbler's movement. The initial movement of the tumbler has always been independent of the counterweight, which construction permits of considerable vibration of the tumbler between the lower limit of its movement and the point at which it contacts with the tumbler. This feature, which is a very objectionable one in springless locks, where the movement and vibration of the parts are not prevented by the imposition of springs or the like, has heretofore been essential, inasmuch as the positive engagement between the tumbler and counterweight would cause a considerable movement of the latter and would retract the latch-bolt to a considerable extent whenever the lock-bolt is actuated. It will be observed that by reason of the structural peculiarities of my lock the movements of the latch-bolt and lock-bolt are entirely independent, and the actuation of the lock-bolt tumbler, while constantly and positively controlled at all times by the counterweight, does not actuate the latch-bolt to any appreciable extent. The reason for this is that the counterweight and tumbler are disposed oppositely with respect to their pivots, the pivotal point of one being adjacent to the free extremity of the other. The connection between these parts is made at the free extremity of the counterweight and adjacent to the pivot of the tumbler, the actual contacting surfaces being restricted to a frictional minimum by the employment of a pointed lug 36, located adjacent to the pivot of the tumbler and contacting with the free extremity or tailpiece of the counterweight. It will be noted that the latch-bolt is pivoted to the counterweight at a point comparatively adjacent to the latter, and this peculiar relative arrangement of the pivotal connections of the parts and the location of the contacting surfaces of the tumbler and counterweight, as specified, permits the front end of the tumbler to be moved through a considerable arc, but the lug 36 being located adjacent to the pivot 31 its movement is comparatively slight. This slight movement is imparted to the counterweight at its extreme free end, where its movement is greatest, and as the pivot of the latch-bolt describes an arc of less than half the radius of the arc described by the free end of the counterweight the longitudinal movement of the latch-bolt when the tumbler is elevated is infinitesimal, or, on the scale shown in the drawings, is actually about one sixty-fourth of an inch to the one-fourth inch movement of the front end of the tumbler. Thus the weight of the counterweight is always imposed upon the tumbler to prevent its material displacement and to absolutely eliminate all vibration, and the latch-bolt is unaffected by the movement of the tumbler preparatory to retracting the lock-bolt.

The latch-bolt is preferably guided in its reciprocal movement by opposite recesses 38 in the two side walls of the case. Similar re-

cesses 39 may also be provided for the head of the lock-bolt, if desired. The latch-bolt is held in position upon its pivot-pin 9, as by a stud 40 on the side plate 3 of the case. The stud 40 serves at the same time to hold the counterweight 8 upon its pivot-stud 7. A retaining-lug 41 upon the side plate serves to confine the lock-bolt in its reciprocal movement against lateral displacement.

In addition to the mechanism above described I prefer to provide dead-latch mechanism, which may consist of any suitable device for preventing, when in play, the movement of the latch-bolt-actuating member. Such mechanism may be applied to any part of the latch-bolt-actuating member that may be desired. As illustrated, however, it consists of a swinging pin 42, longitudinally fixed in bearings 43 in the case and projecting through the case to afford means for operating it, being provided on the outside of the case with a head 44 for that purpose. The pin 42 may be provided with a wing or detent 45, which by the swinging movement of the pin may be swung into or out of the path of movement of the bolt-actuating member. When swung into the path of that member, it prevents its movement upon its pivot-stud 7; but when swung to one side it permits its free movement in the manner previously described.

By reference to Figs. I and III of the drawings it will be noted that when the detent 45 is thrown into engagement with the counterweight the tumbler 32 is in contact with the lower wall of the casing and is held positively in this its lowermost position by actual positive contact with the counterweight, which in turn is held securely and against vibration by the detent, and, further, that the lugs 17 and 18, opposed to the faces 19 and 20, will prevent any movement of the arm 16, which in turn will dog the spindle 14, and the latch-bolt being secured to the counterweight and the lock-bolt being dogged by the tumbler every element within the lock-casing is held positively against the slightest movement without the employment of springs or equivalent mechanism.

What I claim is—

In a lock, the combination with a casing, of a counterweight pivoted at its upper forward corner within the upper forward corner of the casing and extending rearwardly adjacent to the rear wall of the casing, a latch-bolt pivotally secured to the lower forward corner of the counterweight, counterweight-actuating mechanism having positive connection with said counterweight, a lock-bolt, a tumbler pivoted at its rear extremity adjacent to the rear wall of the casing and operatively connected with the lock-bolt, said tumbler being limited in its downward movement by contacting with the lower wall of the casing, an upwardly-extending projection upon the tumbler adjacent to its pivot and

in positive contact with the extreme rear end
of the counterweight when the tumbler is in
its lowest position, and a detent designed to
lock the counterweight in position to confine
5 the tumbler immovably between said coun-
terweight and the lower wall of the casing
whereby the entire assemblage of operative
parts within the casing may be locked posi-

tively against movement, vibrational or oth- 10
erwise, substantially as specified.

In testimony of all which I have hereunto
subscribed my name.

HENRY B. RICHARDSON.

Witnesses:

JOSEPH L. ATKINS,
CHAS. C. HAMMOND.